

Giovanni 3.0.7 has been released!

Here are some of the exciting new functions that you'll find in Giovanni 3.0.7:

- ☞ The **Climatology and Anomaly analysis service** has been added to three instances: **TRMM_Monthly**, **ocean_month**, and **MODIS_MONTHLY_L3**. This service can be added to any instance with an existing data climatology product.
- ☞ **New navigation system**: tabs on each of the Giovanni instance Home and Results pages allow users to:
 - Navigate from a result page to another;
 - Maintain all preferences when returning back to the instance Home page;
 - Specify new preferences submit new requests, or navigate to any result page; and
 - Delete unwanted result pages.
- ☞ **New capability to support input data in binary format**: In addition to HDF4, HDF5, and NetCDF formats, now Giovanni has a new data service to support input data in binary format. The following capabilities have been tested: INT16 and FLOAT32; Big Endian and Little Endian; Scale
- ☞ The **Web Map Service (WMS)** application features improved Open Geospatial Consortium Standard compliance.

GES DISC and Giovanni contribute to special issue of IEEE *Transactions on Geoscience and Remote Sensing*

The first issue of 2009 of the IEEE journal *Transactions on Geoscience and Remote Sensing* (TGARS) is a special issue devoted to "Data Archiving and Distribution". Four of the articles in this issue are authored or co-authored by GES DISC staff members. These articles include a contribution about Giovanni, entitled "Giovanni: A Web Service Workflow-Based Data Visualization and Analysis System", authored by Steve Berrick, Greg Leptoukh, John Farley, and Hualan Rui. If you are interested in receiving a reprint, contact us by our Giovanni email address, giovanni-disc@listserv.gsfc.nasa.gov.

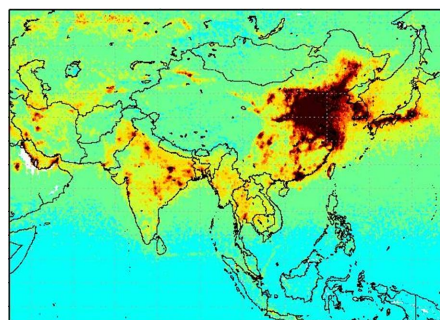
Reference: Berrick, S. W. , G. Leptoukh, J. D. Farley, and H. Rui, 2009: Giovanni: A Web Service Workflow-Based Data Visualization and Analysis System. *IEEE Trans. Geosci. Remote Sens.*, **47**, 1, 106-113, doi: 10.1109/TGRS.2008.2003183

This article may be cited as a general reference for Giovanni, along with Acker, J.G. and Leptoukh G., 2007: Online Analysis Enhances Use of NASA Earth Science Data. *Eos, Trans. AGU*, **88** (2), 14 & 17.

New Giovanni brochure is now available

The GES DISC has printed an updated version of the Giovanni informational brochure. New images have been added that showcase Giovanni capabilities for scientific data analysis. The cover image shows the "Asian dragon" cloud of nitrogen dioxide resulting from smoke and industrial emissions over India and China, as seen in a four-month average between February and April 2008. (See below). Also shown is the SO₂ cloud from the Aleutian Kasatochi volcano as it was transported over North America in August 2008.

Users have told us how much they like Giovanni – we include a quote from a satisfied user who told us that Giovanni provides earth science information to an "increasing and broader audience". (We think it does that, too.) Emphasizing this scientific aspect, a paper stemming from the Giovanni chlorophyll image of the Gulf of Mexico after the passage of Hurricane Katrina (shown in the brochure) is in the final stages of printing preparation at *Geoscience and Remote Sensing Letters*. If you would like some brochures, send a message to the Giovanni email address, giovanni-disc@listserv.gsfc.nasa.gov.



Giovanni at the American Geophysical Union 2008 Fall Meeting

Giovanni made quite an impression at the American Geophysical Union's annual Super Bowl of Science, otherwise known as the Fall Meeting, which takes place every December in San Francisco, California. This year's meeting occurred December 15-19. The GES DISC Web site has news items describing most of the abstracts presented by GES DISC staff at the meeting; below are descriptions of selected Giovanni-related presentations excerpted from these news items.



"Modern Era Retrospective-analysis for Research and Applications (MERRA) Data and Services at the GES DISC" provides an overview of the new data archive and related Giovanni instance which will provide data and visualization services for this 30-year dataset, created by NASA's Global Modeling and Assimilation Office (GMAO). MERRA data will be available from the Modeling DISC (MDISC) and will also be available for online analysis in Giovanni. The emphasis of the data products in MERRA is on the global hydrologic cycle.

MERRA Web site: http://disc.sci.gsfc.nasa.gov/mdisc/dataprods/merra_products.shtml

"New Collections of Aura Atmospheric Data Products at the GES DISC" presents a description of atmospheric data collected by sensors on NASA's Aura satellite. The new data includes the Ozone Measuring Instrument (OMI) Level 2G daily global binned data product, and also the OMI daily Level 3 gridded data product. Microwave Limb Sounder (MLS) data are now Version 2.2. High Resolution Dynamics Limb Sounder (HIRDLS) data are now Version 2.4.29. The data are available from the GES DISC and are also in the Giovanni system, providing Giovanni's online data analysis capabilities.



"The NASA NEESPI Data Portal: Products and Tools" provides information about the GES DISC portal for the Northern Eurasian Earth Science Partnership Initiative (NEESPI). The GES DISC provides access to land surface data, atmospheric data, and cryospheric data utilizing the Giovanni system. Recently, the GES DISC has developed a data product metadata database prototype to expand the data portal with additional data product information, with the intention of leveraging data sharing. This expansion should make finding relevant data easier for NEESPI scientists.

NEESPI Web site: <http://neespi.sci.gsfc.nasa.gov/>

"Using NASA's Giovanni Web Portal to Access and Visualize Satellite-Based Earth Science Data in the Classroom" discusses the potential advantages of utilizing the GES DISC Giovanni system, along with other data services, to enhance the classroom research experience in earth science. Giovanni's available data sets include data for atmospheric and ocean processes, and land and model data is being enhanced. The GES DISC is currently creating a set of training modules to provide additional user experience and skill with the data and visualization capabilities found in Giovanni.

"Data Visualization and Analysis for Climate Studies Using NASA Giovanni Online System" presents the Giovanni system in the context of societal response to climate and environmental change. Giovanni provides data that is crucial to environmental change assessment, particularly such analyses as long-term means; time-series and trend analysis; intra- and interannual variability; and data which characterizes a wide range of societally relevant extreme events, which are frequently related to hazardous or detrimental conditions.

"NASA Airborne-Simulated Vertical Data in Google Earth" presents a visually-exciting demonstration of the display of vertical profile data from NASA instruments such as Cloudsat, CALIPSO, and instruments on the Aura platform. The data are presented as if viewed from the perspective of an aircraft flying along the satellite track. This visualization utilizes a COLLADA (Collaborative Design Activity) 3-dimensional model available in Google Earth.

"Spatial and Temporal Variability Analyses of the Chesapeake Bay Outflow Plume with Satellite Ocean Color Data" will present a multi-year characterization of the discharge plume from the Chesapeake Bay into the coastal Atlantic Ocean utilizing 11 years of SeaWiFS ocean color data and 6 years of MODIS-Aqua ocean color data. Analysis of the spatial and temporal dynamics of the plume was performed with the Giovanni system.

American Meteorological Society Annual Meeting

GES DISC staff and colleagues present short course on Giovanni

At the Annual Meeting of the American Meteorological Society in Phoenix, Arizona, GES DISC staff are presenting a one-day short course entitled "Online Visualization and Analysis of Atmospheric Processes Utilizing NASA Satellite Data in Giovanni, on Sunday, January 11, 2009.

The basics of satellite remote sensing, data formats, and Giovanni analysis functions will be described. These presentations will be followed by descriptions of data relevant to meteorology in Giovanni, including data from the Tropical Rainfall Measuring Mission, Cloudsat, MODIS, AIRS, and OMI. There will be two case studies, one covering cloud and precipitation data, and the other discussing air quality. At the end of the course, a short period will be provided for attendees to use their own laptop computers to access Giovanni and analyze the various data types presented in the course.

The GES DISC staff who will be presenting sections of this short course are Steven Lloyd, Hualan Rui, Gregory Leptoukh, and Zhong Liu. Dr. Sundar Christopher of the University of Alabama-Huntsville will provide his expertise on air quality and aerosol data analysis.

This course is the first of several remote-sensing data training courses that will be carried out by GES DISC staff and colleagues in 2009. For more information on the training courses and the schedule of upcoming opportunities, contact Ana Prados, "Ana.I.Prados@nasa.gov". The short courses are intended for in-depth training of professional audiences to improve understanding of how NASA remote sensing data can be used for applications such as monitoring of environmental and public health impacts and decision-making.

Giovanni and Volcanoes

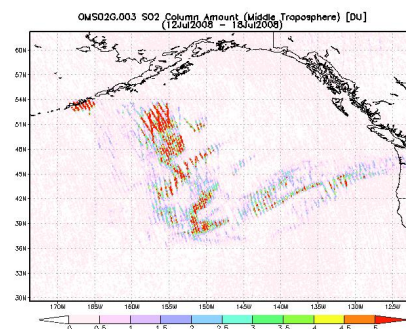
There have been several volcanic events this past year that have produced emissions plumes which can be visualized well with Giovanni. Below are descriptions of the events and times, the data products and Giovanni instances that can be used to examine them, and example images on this page and the next page.

Chaiten Volcano, Chile, South America:

Chaiten volcano, which had not erupted historically, exploded in May in an eruption that is still continuing. Lahars (mud flows) impacted the port of Chaiten city, requiring evacuation of most of the coastal town; the mud from the ash now fills the harbor, making it unusable. *Instance:* MODIS Daily. *Data product:* Aerosol Optical Depth. The image on the next page shows the transport of ash and volcanic aerosols over Argentina and the southern Atlantic Ocean.

Okmok Volcano, Aleutian Islands, Alaska, North America:

Eruption began July 12; activity continued into August. *Instance:* OMI L2G. *Data product:* SO₂ Middle Troposphere. This data product shows the movement of the eruption cloud from Okmok over the northern Pacific and the Pacific Northwest of the United States, July 12-18.



Kilauea Volcano, Hawaiian Islands:

Continuing activity from coastal flows and vent (subterranean lava lake) in Halemaumau crater.

Instance: MODIS Daily. *Data product:* Aerosol Optical Depth. Continuous activity means that the vog (volcanic fog, composed primarily of sulfur aerosols and volatile acids) plume is detectable almost every day. On December 3-4, 2008 the vog was particularly thick (see next page).

Dallafilla Volcano, Afar Triangle, Ethiopia, Africa:

Several shield volcanoes and fissures are found in this active volcanic region of the Rift Valley. On November 4, a massive fissure eruption from Dallafilla volcano commenced, eventually covering approximately 15 square kilometers with lava. *Instance:* OMI L2G. *Data Product:* SO₂ Middle Troposphere. The image on the next page shows the position of the sulfur dioxide cloud emanating from the eruption for four days, November 4-6, 2008.

Kasatochi, Aleutian Islands, Alaska:

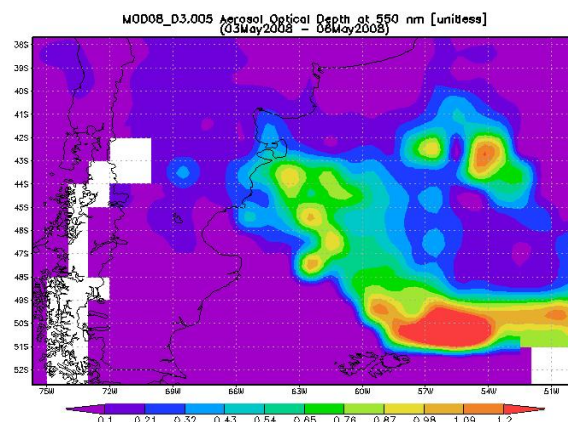
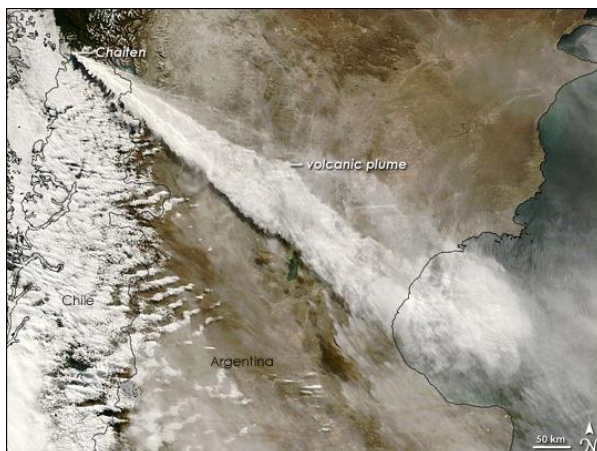
The small Aleutian island of Kasatochi unleashed a powerful eruption on August 7, 2008. The large eruption cloud was divided and dispersed by upper level winds.

Instance: OMI L2G. *Data product:* SO₂ Middle Troposphere. The image on the next page (also in the Giovanni brochure) shows the movement of the eruption cloud from Kasatochi over North America and the United States, August 12-14, 2008.

2008 volcanic events and associated imagery

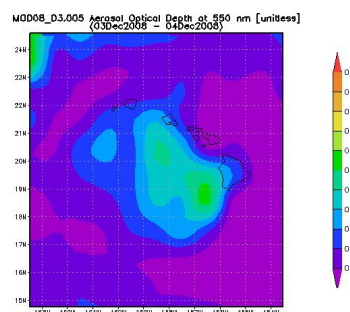
Chaiten Volcano

Eruption plume on May 3 from MODIS (left); image from NASA Earth Observatory
MODIS AOD at 550nm, May 3-6, 2008 (right)



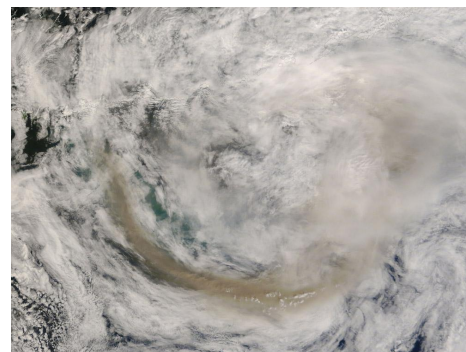
Kilauea Volcano

MODIS image (left) on December 3, 2008 (from NASA Earth Observatory)
MODIS AOD at 550nm, December 3-4, 2008 (right)



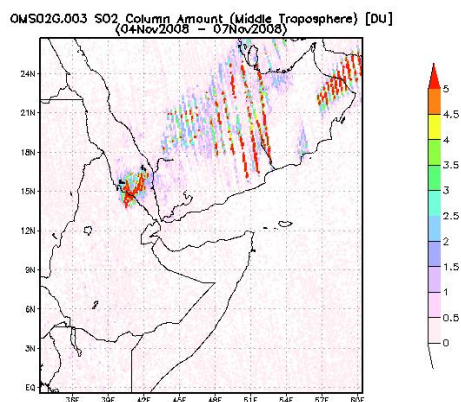
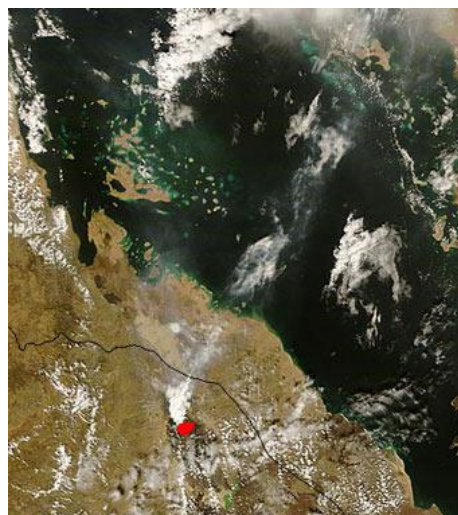
Kasatochi Volcano

MODIS image of ash from Kasatochi Volcano on August 13, 2008, above the clouds over the northern Pacific Ocean (from the MODIS Web site)



Dalafilla Volcano, Afar Triangle, Ethiopia

November 4 MODIS image (left) from the MODIS Web Site.
OMI SO2 Middle Troposphere, November 4-6, 2008 (right)



OMI SO2 Middle Troposphere, August 12-14, 2008.

